

Operating Manual



Oxygen Analyser

Digox 6

Dr. Thiedig + Co
Prinzenallee 78-79
D-13357 Berlin
Phone: +49 30 49 77 69-0
Fax: +49 30 49 77 69-25
E mail: info@thiedig.com
www.thiedig.com

Service hotline: (+49) 30 49 77 69-42

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The instructions at hand are intended to make you familiar with the functions of the **Digox 6** analyser and to properly operate the device.

The unit should be operated by trained personnel only.

The operating manual contains the following additional information:



WARNING!

This indicates a warning note to avoid improper operating states of the unit.

NOTE:

Here you get further information and details.

You should always place this operating manual within reach of the location of the **Digox**.
Due to technical improvements, some descriptions and figures in this operating manual may slightly differ from the functions of your **Digox** unit.
Therefore, no claims can be made on the grounds of data, figures and descriptions included in this manual.

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In case of questions regarding the **Digox 6** analyser, please contact:

Dr. Thiedig + Co.

Service phone: **(+49) 30 49 77 69-42**

email: service@thiedig.com

1 Introduction

1.1 Conventional use

The oxygen analyser **Digox 6** measures reliably, precisely and quickly the oxygen content in beer, soft drinks and water in the trace range between 0.001 and 20 mg/l.

The precise measuring principle, the built-in calibration device, the solid assembly and the easy handling of the **Digox 6** are ideal conditions for an analyser for quality control in breweries and filling machines.

1.2 Unit description

The **Digox 6** consists of the analyser block and the splash-proof display and user field.

The analyser block contains the calibration device, the measuring cell system as well as the sensors for temperature and flow measurement. It is mounted on the back of the housing and is protected by a cover.

The **Digox 6** has connections for power supply, recorder outputs and PC interface.

The unit has a built-in battery charger for approximately 8 hours operation independent of the mains.

The unit can also be operated via the power supply, however, for a steady state we recommend using the stationary measuring unit Digox 5S.

The **Digox 6** has a data logger and in connection with the Touch-Memory-System (optional) has an additional data memory. The data communication is carried out via the PC interface.

1.3 Measuring principle

The Thiedig measuring principle for the analysis of oxygen traces operates according to the potentiostatic 3 electrodes measuring system developed by Prof. Tödt and Dr. Teske.

The principle is based on an electrochemical reduction of dissolved oxygen at the measuring electrode. For this, the measuring electrode is polarized.

The measurement takes place directly in the medium. The sample is the electrolyte for the electrochemical reaction. This enables the measurement without using membranes. The membrane-free sensor measures quickly, drift-free and reliably in the temperature range between -5 and +50 °C.

The reduction of oxygen causes a measuring current between both electrodes.

This measuring current is a direct measure for the oxygen concentration in the sample. The Thiedig sensor uses this measuring principle in a potentiostatic regulated grouping of 3 electrodes. The measuring current depends on the temperature and flow of the sample. The built-in flow and temperature sensors measure these variables. The **Digox 6** software corrects the measuring values. Corrections are carried out automatically via the medium.

To calibrate the oxygen analyser, different procedures can be used. Some operate fully automatically. Here the calibration is carried out without interrupting the measuring process.

1.4 Processing measuring data

The supplied software **DigoxWin** runs under the operating system Windows 98/ 2000/ XP. The measuring data can be displayed, saved as well as evaluated in tables or graphically online on the PC. The measured data can be processed with Microsoft Excel TM.

The optional Touch-Memory-System can be combined with the data storage. Touch-Memories are individually programmed data storage (TouchKeys), which are attached to measuring points. They automatically enable a safe allocation of measurement and measuring points.

In addition, when using the special user TouchKeys, a clear allocation of user and measurement is ensured.

In the created data file, the measuring values, the measuring point and the user are filed.

If you have further questions regarding the use and the advantages of this system, please do not hesitate to contact us.

1.5 Connections



Figure: 1.1

- 1 Regulating valve sample flow
- 2 Moisture indicator for housing interior
- 3 Socket for RS-232 interface or Touch-Memory Stick (optional)
- 4 Sample out flow Out
- 5 Socket for recorder output/ measuring range identification
- 6 Socket for plug-in power supply unit

Figure: 1.2

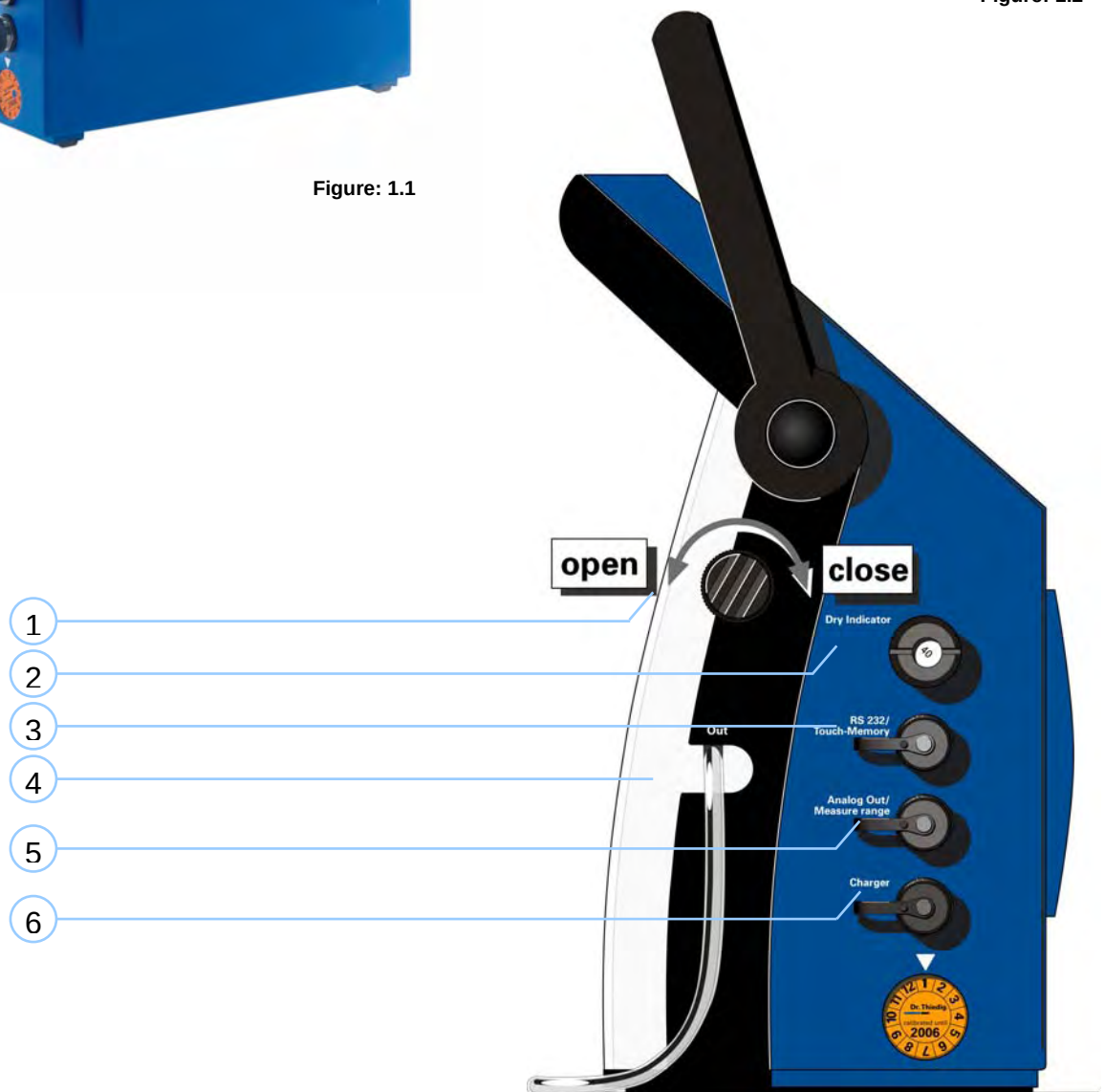


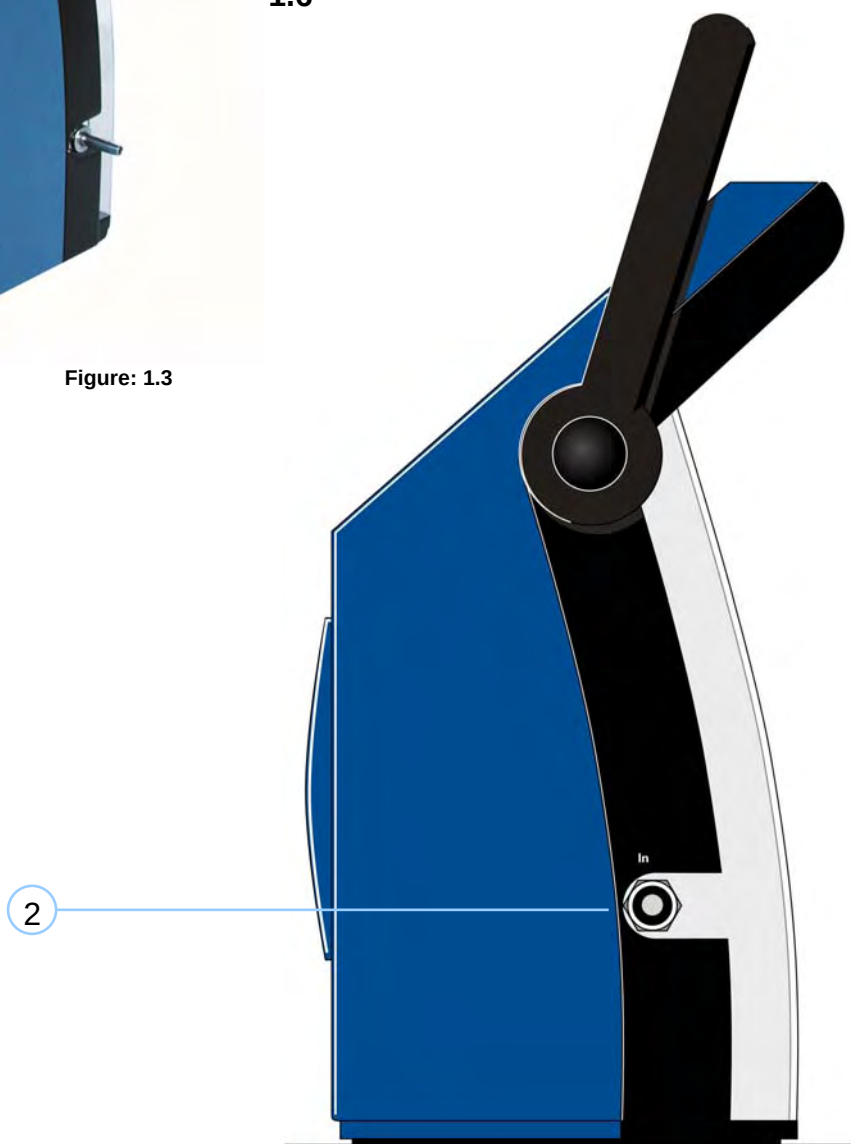


Figure: 1.3

- 1 Display
- 2 Sample supply In

1.6

Figure: 1.4



Operating elements

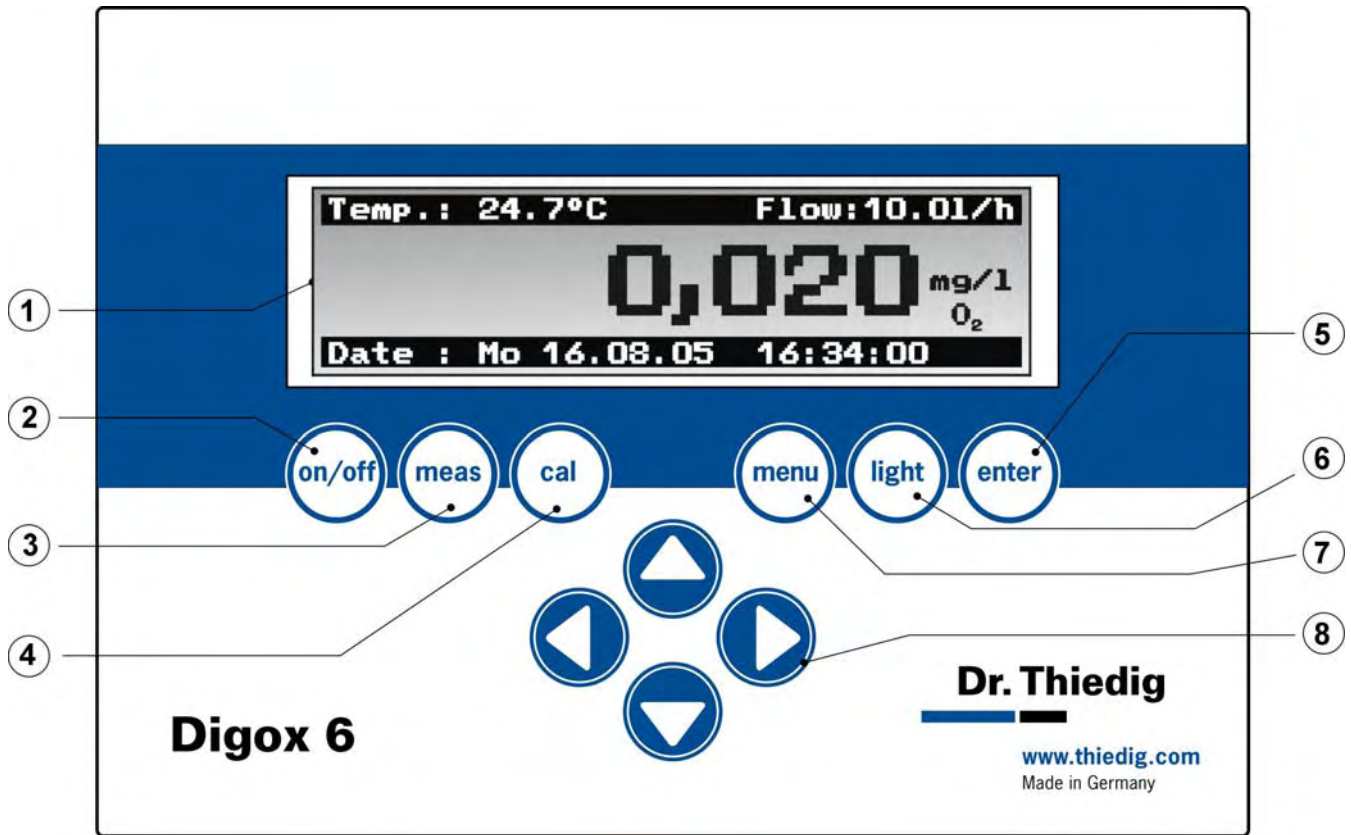


Figure:1.5

- | | |
|---|--|
| <p>1 Display,
"Measuring" is displayed, the measuring mode is active</p> | <p>6  Press this key once –
to switch the display lighting on,
after the set lighting period has passed,
the light goes out independently</p> |
| <p>2 
To switch the Digox 6 on
– shortly press this key
To switch the Digox 6 off
– press and hold the key for 5 seconds</p> | <p>7  To open the main menu</p> |
| <p>3  to switch the measuring mode on</p> | <p>8 Cursor keys
To make your selection and to enter numbers.</p> |
| <p>4  to open the calibration menu</p> | |
| <p>5  to confirm your input</p> | |

Notes:

2 Menu overview

2.1 The "Measuring" screen

The "Measuring" screen appears automatically after switching the **Digox 6 on** or after pressing



Figure: 2.1

- 1 Faulty parameter
- 2 Measuring value
- 3 Sample temperature in [°C]
- 4 Flow in [l/h]
- 5 Date and time

2.2 Calibration menu

To enter press .

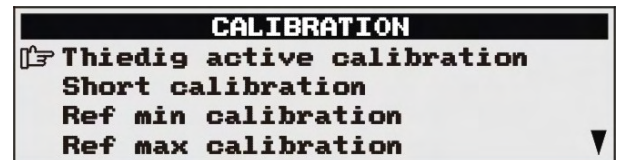


Figure: 2.2

Selection of the calibration mode:

- Thiedig active calibration, section 4.4
- Short calibration, section 4.6
- Reference calibration, section 4.7
- Calibration of the flowmeter, section 4.3

Use  scroll down.

2.3 Main menu

To enter the main menu press .



Figure: 2.3

Mark the desired function with  or  and confirm with .

- select the medium
- data logger, see section 5.2
- poll status (e.g. Ks factor), see section 8.1
- set measuring range, see section 8.2
- battery status, see section ???
- Code for entering menu level 2, see section 8.3

NOTE:

A four-digit code can be used to protect menu level 2 functions against unauthorised use. The default setting is **9999**.

2.4 Menu level 2

Confirm the last entry in the main menu with .



Figure: 2.4

Select numbers with  or , mark the next digit with .

Press  to confirm the code.

Menu level 2 is opened. Here the following functions are available:

- System settings, see section 8.3.1
- Select interface, see section 8.3.4
- Set clock, see section 8.3.5
- Identification, see section 8.3.6
- Enable options, see section 8.3.7
- System check, see section 8.3.8
- Flowmeter, see section 8.3.9
- Generate code, see section 8.3.10

NOTE:

Please also take into account the menu overview in the appendix and the enclosed quick reference.

3 Taking the unit into service

Before you can use the Digox 6 to do measurements, you must carry out some preliminary steps.

3.1 Filling the reference electrode with KCl solution

The measuring system is equipped with a reference electrode for a precise setting of the measuring potential. During operation, this electrode immerses into a 15% KCl solution.

NOTE:

This solution is included in the service pack. Before taking the unit into service, you have to fill the analyser block with the solution.



WARNING!

Before the analyser block is filled with sample, the reference block must have been filled with the KCl solution.

In order to fill the reference cell, the analyser block has to be dismantled.

Removal of analyser block

1. Lie the analyser flat on a table with the reverse side showing upwards.
2. Loosen the knurled screws on the cover of the analyser block and remove the sealing plug.
3. Loosen the knurled nuts and remove the plug connector from the electrodes.
4. Now you can take off the analyser block from the holders and in order to fill, place vertically.

Filling

1. Unscrew the reference electrode (1) from the analyser block (Figure3.1).
2. Fill the KCl solution into the hollow place as far as to the tip of the V.
3. If required, remove air bubbles from the diaphragm bridge (2) by slightly tilting the analyser block (Figure3.2).
4. Screw in the reference electrode and re-attach the analyser block.

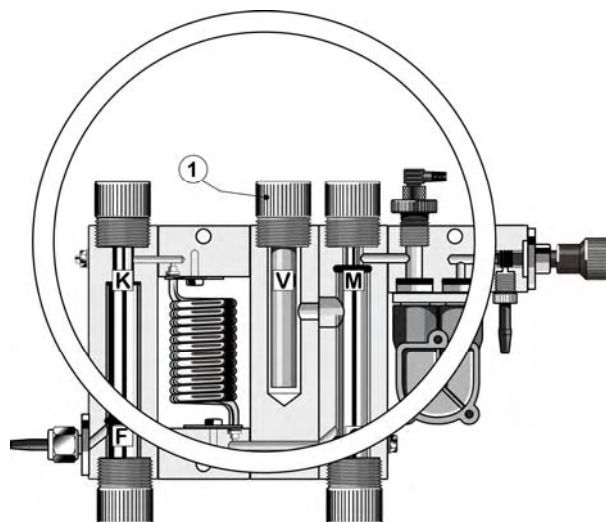


Figure:3.1

3.2 Connections

A flexible hose and two hose clips are included in the scope of supply to connect the **Digox 6**.

NOTE:

Keep the feed line from the samplings point to the analyser as short as possible.

If reductions, clutches or other hose adapters are used, air bubbles could settle on it. Because of this, the running-in time of the analyser is prolonged in order to reach low concentrations.

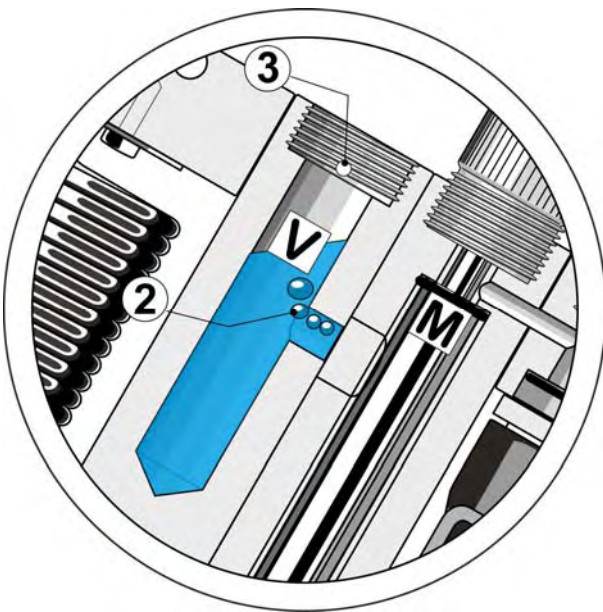


Figure:3.2

NOTE:

When screwing in the reference electrode, excess KCl solution will leave the bore (3) (Figure 3.2). Please collect the liquid with absorbent paper.



WARNING!

The analyser block should now rest for about 15 minutes so that the diaphragm can take up the KCl solution.



WARNING!

Only use oxygen-proof hoses. Silicon hoses will lead to higher oxygen values.

3.3 Taking the unit into service

Shortly press  to switch the **Digox 6** on.

The starting screen is displayed.

The **Digox 6** will at first perform a system check.

Then the message

"The current user of this unit is" *****

Version X.X".

Then the "Measuring" screen appears (see section 2.1).

NOTE:

The message "Version X.X" indicates the current firmware version of the Digox 6.

To switch the **Digox 6** off, press  and hold it for at least 5 seconds.

4 Calibration of the Digox 6

4.1 Introduction

During measurement in the liquid samples, the electrochemically active surface of the electrode system may change. By this, the sensitivity of the measuring electrode will change as well. Therefore, the electrode system needs to be calibrated from time to time.

The **Digox 6** has a built-in process regulated calibration system, which can carry out a calibration without interrupting the measuring series.

For the **Thiedig active calibration** and the short calibration, a defined increase of the oxygen concentration is produced. This is done by electrolysis of the sample. The resulting increase of the measuring current is used to determine the calibration function. With the essential requirement "no oxygen – no measuring current" the processor places this function through the zero point (Figure: 4.1.)

The Thiedig active calibration lasts about 120 seconds. During the actual calibration, the measuring conditions are also being monitored.

The **short calibration** operates similar to the Thiedig active calibration, however, it does not compare the values of measuring current, flow and temperature with those of the beginning. It lasts about 60 seconds.

Cross-sensibilities can be eliminated with the **reference calibration**. For this, two defined oxygen concentrations Ref min and Ref max must be set. The calibration line is crossing those two points.

The reference calibration takes into account all conditions deviating from the ideal case (the function crosses the zero point) (Figure: 4.1).

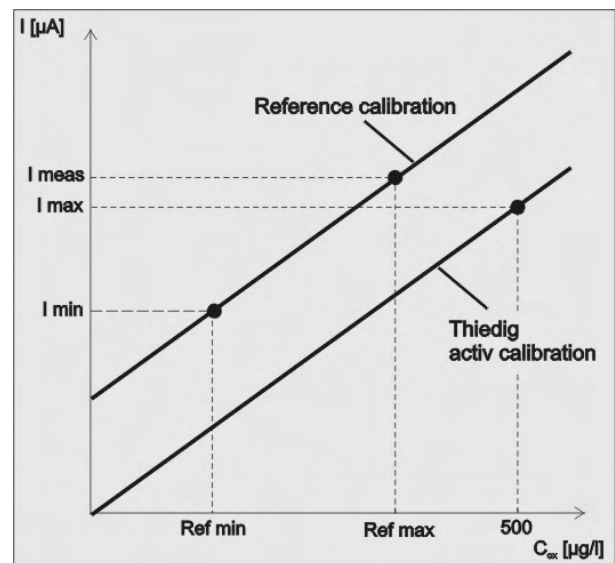


Figure: 4.1

Individual cases and recommended calibration

Measurement in beer

- For the measurement in beer, we recommend using the Thiedig active calibration for most cases.

Trimming of an offset (cross-sensibility)

- If an offset occurs during the measurement, which means the indicated measuring value is increased by the same value in the total measuring range, this offset can be corrected.
- For this, the Ref min calibration determines a zero current I_{zero} . A combination with the other calibrations is possible.

NOTE:

Should implausible results occur during the Thiedig active calibration, please check the zero current (section 8.1, Status display). It should be 0µA in most cases. In order to delete the zero current, please refer to section 4.6.1, Ref min calibration.

Measurements with the sampling device.

- The short calibration is especially suitable for cases in which constant measuring conditions for a calibration are only available for a short time.

Measurement in wort

- If the oxygen concentrations are above 1mg/l (e.g. in wort), it is no longer possible to carry out a Thiedig active calibration.
- For this, we recommend carrying out a Ref max calibration. In the course of this, the **Digox 6** is trimmed with an externally determined reference value.

NOTE:

Due to a frequently occurring content of suspended particles, blockages in the analyser block can happen during the measurement in wort. Therefore, we recommend the following practical steps:

- Secure the hose, which is connected at the sample return, with a hose clamp.
- On this hose, put a hose clip after the regulating valve and open the regulating valve as far as it will go.
- Regulate the flow via the hose clip after the analyser block.

For further uses, please do not hesitate to contact us.

4.2 Variables influencing calibration

4.2.1 Flow

Measurements done at open electrodes are influenced by the flow volume. Flow volumes between 3 and 18 litres per hour affect the measuring value of the medium water and of the medium beer, which is then compensated by the **Digox 6**.

NOTE:

If a flow volume outside this range is found, the value indicating the flow will flash in the "Measuring" screen, and an indicating symbol will appear.

The accuracy of the flow measurement depends on the viscosity of the medium.

4.2.2 Pressure

The pressure of the sample does not influence the measured value. The measuring system of the **Digox 6** has been designed for operating pressures of up to 8 bar, allowing for short pressure peaks of up to 16 bar.

4.2.3 Temperature

The measured value is influenced by the temperature with a gradient of 3% per °C. The **Digox 6** has got a temperature compensation in the range between 0 and +50 °C.

4.3 Calibrating of the flowmeter

The calibration of the flowmeter is done in the works with water. When taking the unit into service, the **Digox 6** should be calibrated with the measuring medium.

When calibrating the **flowmeter**, the Kf factor is determined. Usual values are between 0.9 and 1.2.

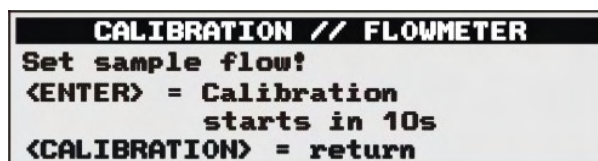
Calibration does not have to be repeated in regular intervals. We recommend one-year intervals.

4.3.1 Preparation

Required means

- Measuring cylinder, 250 ml (included in the supply)
- PVC hose (included in the supply)

1. Connect the sample supply (marker In) to the sampling point.
2. Connect the PVC hose to the sample return (marker Out).
3. Switch the **Digox 6** on and wait until the "Measuring" screen appears.
4. Set the flow at the regulating valve to 10 litres per hour, check the measured value in the display.
5. Press  .
The calibration menu is opened. Use the cursor keys to mark the menu item FLOWMETER.
6. Press  . The following display appears.



CALIBRATION // FLOWMETER
Set sample flow!
<ENTER> = Calibration
starts in 10s
<CALIBRATION> = return

Figure 4.2

4.3.2 Carrying out the calibration

1. Press the  key. The calibration starts after 10 seconds and takes 60 seconds.
2. When the 60-second countdown starts, lead the hose from the sample return line into the measuring cylinder and collect the sample.
3. Calibration is completed after 60 seconds. Remove the hose from the measuring cylinder.
Then press the  key to confirm the message.
4. Read and enter the volume of the liquid collected. Press  or  to select a number.
Press  to mark the next digit.
5. Use  to confirm your input.

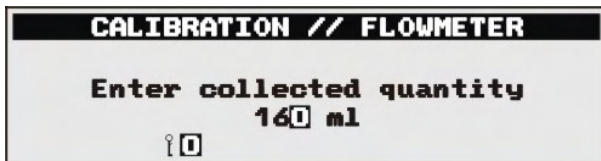


Figure4.3



WARNING!

The value to be entered should be between 150ml and 180ml.

If a wrong value is entered, for example 500ml, the Kf factor will be re-adjusted. This can only be rectified by the Dr. Thiedig+Co maintenance service.

6. The Kf factor is displayed for 3 seconds. Then the display returns to the calibration menu.
7. Press  to return to the "Measuring" screen.

4.3.3 Check Kf factor

1. Press  to open the main menu.
2. Press  to mark the menu item STATUS.
3. Press . The submenu STATUS displays the K_f factor.



Figure: 4.4

4.4 Thiedig active calibration

During the Thiedig active calibration the Ks factor is determined. The Ks factor is the measure for the measuring electrode's sensitivity.

The active calibration lasts approximately 120 seconds.

NOTE:

A low Ks factor indicates a low measuring sensitivity.

If the value is smaller than 0.4, we recommend cleaning the measuring electrode. If the Ks factor is below 0.2, a calibration is no longer possible.

4.4.1 Preparation

NOTE:

Each calibration must be carried out with a flow between 9.1 and 10.9 l/h.

After connecting the unit to the sampling point, let "run down" the oxygen value first.

Only Start the calibration, if the values of the temperature and of the oxygen concentration are stable.

4.4.2 Carrying out the Thiedig active calibration

1. Press . The calibration menu is opened. Select THIEDIG ACTIVE CALIBRATION.

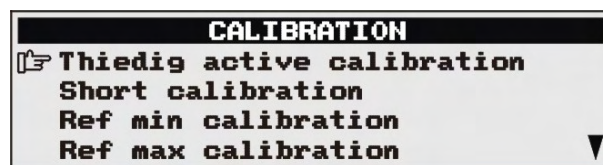


Figure: 4.5

2. Press . The calibration starts. Then a countdown appears, beginning with 60 seconds.

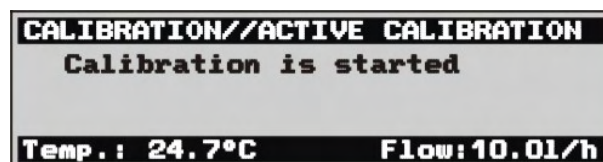


Figure:4.6

Calibration procedure:

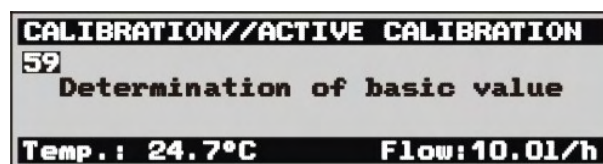


Figure:4.7

60s - 56s

Measuring current, flow and temperature are determined (basic values)



Figure: 4.7

55s - 41s

Tolerances are checked

Measuring current: max. 0.5 %
Flow max. $\pm$ 0.5 l/h
Temperature : max. $\pm$ 0.5 °C

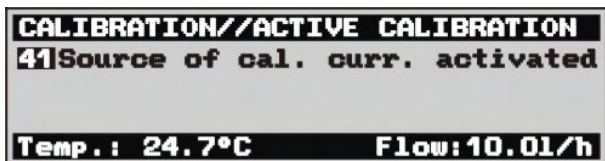


Figure: 4.8

40s - 0s

The measuring current produces a defined amount of oxygen in the sample. The formed oxygen quantity depends on the current flow.

3. Current (real) measuring values and desired (ideal) measuring values are displayed.

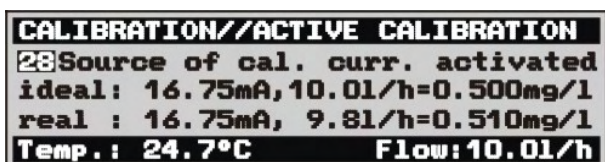


Figure: 4.9

4. After oxygen has been generated, the device automatically opens the "Measuring" screen.



Figure:4.10

5. Sixty seconds after oxygen has been generated, a **comparison** with the start values is carried out. In the course of this, undesired variables (drift of the oxygen value, temperature and flow) are examined during calibration.

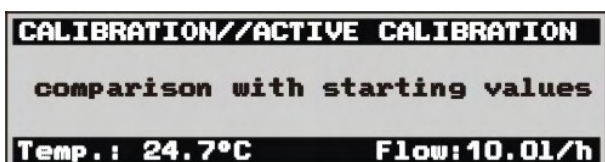


Figure: 4.11

A comparison shows no deviation – the newly calculated Ks factor is displayed (Figure: 4.12).



Figure: 4.12

A comparison shows a deviation – please refer to fault messages (section 7).

Although a deviation has been established, the calibration can be accepted by the user. In the course of this, the error code will be displayed in the calibration history. If aborted, the calibration would not be accepted.

After this, the **Digox 6** changes again into the measuring mode and displays the current oxygen value in the sample.

NOTE:

If an error message is displayed after completing the calibration, we recommend carrying out the calibration once more, bearing in mind the error source listed below.

4.4.3 Check Ks factor

The Ks factor of the measuring electrode should be checked after each active calibration. By doing this, the required calibration interval can be determined.

1. Press .
The main menu is opened.

Press  twice to highlight the menu item STATUS.
2. Press .
The submenu STATUS displays the Ks factor.

MENU // STATUS	
Ks-coeff. : 0.61	Kf-coeff.: 1.01
Zerocurr. : 0 PA	
Sample : Wasser	
Meas.range: automatic	

Figure: 4.13

3. Press  again:
The last three active calibrations are displayed, including date, time and, if applicable error code (please refer to section 7).

MENU // STATUS	
Last three active calibrations	
28.10.03 13:06	Ks=0,98 OK
28.10.03 12:41	Ks=0,95 OK
28.10.03 11:31	Ks=0,96 OK

Figure: 4.14

4.5 Short calibration

During the short calibration, possible changes in oxygen concentration, flow and temperature are not examined during the calibration.
The short calibration takes 45 seconds.

NOTE:

The calibration must be carried out with a flow between 9.1 and 10.9 l/h.

After connecting the unit to the sampling point, let "run down" the oxygen value first.

Only start the calibration, if the values of the temperature and of the oxygen concentration are stable.

1. Press . The calibration menu is opened.
2. Select the menu item SHORT CALIBRATION and confirm with .
The calibration starts. A countdown is displayed, beginning with 45 seconds.

NOTE:

If the current flow is outside the required measuring range, a fault message will be displayed.

Calibration procedure:

45s - 44s

Measuring current, flow and temperature are determined (start values).

43s - 0s

The calibration current produces a defined amount of oxygen in the sample.

3. After successful calibration, the calculated Ks factor is displayed for 3 seconds.

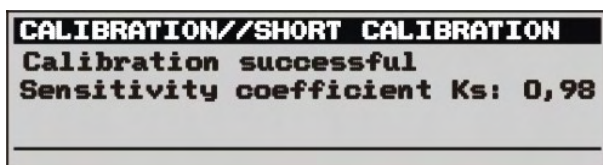


Figure: 4.15

4. Then the **Digox 6** automatically shifts to the "Measuring" screen.

NOTE:

Short calibrations are not saved in the menu STATUS.

4.6 Reference calibration

During the reference calibration, the two points **Ref min** and **Ref max** are determined, with the help of which the calibration function is determined.

NOTE:

The **Ref min value** is also called **zero current** because a correction of the zero point can be carried out with the **Ref min calibration** (please also refer to section 4.1).

The zero current is displayed in MENU \ STATUS (please also refer to section 8.1).

4.6.1 Ref min calibration

1. Press . The calibration menu is opened.
2. Press  and hold until the menu item REF MIN CALIBRATION is highlighted. Confirm with .

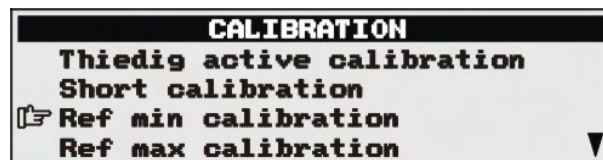


Figure: 4.16

3. A selection menu appears. Highlight the menu item REF MIN CALIBRATION and confirm with .

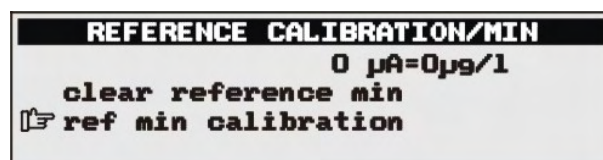


Figure: 4.17

NOTE:

The menu item DELETE REF MIN sets the value for Refmin to 0µA = 0µg/l or deletes the zero current.

4. In the following window press  and start the calibration.

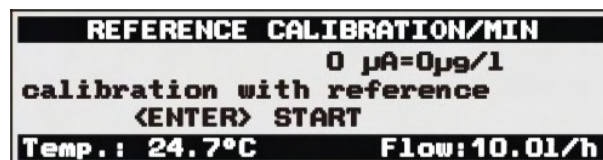


Figure: 4.18

5. A countdown appears, beginning with 50 seconds. After the calibration, a reference concentration is polled. Use the cursor keys to enter it and confirm with .

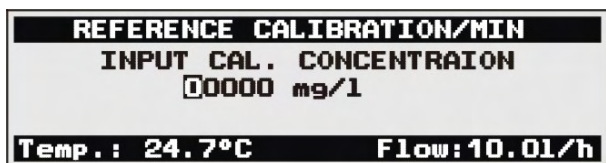


Figure: 4.19

6. After successful calibration, the calculated Ks factor is displayed for three seconds. Then the **Digox 6** automatically shifts to the "Measuring" screen.

4.6.2 Ref max calibration

1. Press . The calibration menu is opened.
2. Press  to select the menu item REF MAX CALIBRATION and confirm with .
3. In the following window press  and start the calibration.

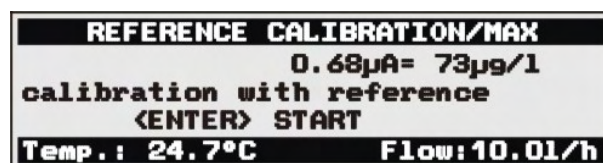


Figure: 4.20

4. The calibration starts. A countdown appears, beginning with 50 seconds. After the calibration, a reference concentration is polled. Use the cursor keys to enter it and confirm with .
5. After successful calibration, the calculated Ks factor is displayed for three seconds. Then the **Digox 6** automatically shifts to the "Measuring" screen.

NOTE:

If the calibration curve is determined again, the most recent point determined, the Ref min value is used as a basis.
With Ref min = 0, the calibration curve crosses the zero point.

5 Measuring

5.1 Conditions of the sample and practical hints

The sample must meet certain conditions in order to ensure error-free measurements:

Parameter	Value	Hints
Conductivity	Minimum: 20 µS	This value will always be fulfilled when used in the beverage industry .
Flow	Permissible 3-18 l/h	The flow is compensated electronically within the limits stated. During the calibration, the flow must be between 9.1 and 10.9 l/h. Only in this range, the calibration can be carried out correctly. This is monitored.
	Standard: 9-11 l/h	
	Ideal: 10 l/h	
Pressure	Minimum: 0.1 bar	Pressure peaks of up to 16 bar are permitted for short intervals.
	Maximum: 8 bar	
Temperature	Minimum: 0 °C	The temperature is compensated electronically within the limits stated.
	Maximum: 50 °C	
	Threshold value: 70 °C	If this temperature is exceeded, it will lead to damages of the measuring block.
	Threshold value: 110 °C (Special edition)	This maximum temperature constancy can be achieved with a brown measuring block (as a special edition).

Using cleaning and disinfection agents with the **Digox 6**:

- Using chlorine disinfection agents: depending on the existing concentration and reaction time, the measurement of the Digox 6 is influenced by the contact of free chlorine (Cl₂) with the measuring electrode. In this case, please get in touch with our customer service.
- In order to internally clean the analyser block, the Digox 6 can be rinsed through in the course of an acid tank cleaning (cold) at the sampling tab. We recommend a monthly interval and using nitric acid-free products.

5.2 The Digox 6 data logger

The **Digox 6** has got 2 separate data storage: the continuous data logger and the measuring point data logger.

The data logger allows to save measuring values and marginal conditions in the unit and to retrieve them later via the data interface.

The **continuous data logger** allows to continuously save the measuring values of a measuring point in intervals that can be set. Three series of measurements can be started in a sequence. A total of 1,000 values can be saved.

NOTE:

The memory can be extended to accommodate up to 3,000 measuring values.

This function can be enabled ex works or by our maintenance service.

When using the continuous data logger, the following conditions must be taken into account:

- Independent of the amount of recorded values, the data logger can be started three times.
- If the total amount of recorded measuring values is attained, the measurement will be stopped and a message will be displayed (please refer to section 7).
If you would like to continue the measurement, this message must be acknowledged.

The **measuring point data logger** is a part of the TouchMemory system and is optional.

5.2.1 How to operate the continuous Data logger

5.2.1.1 Selection of the interval

1. Mark the menu item DATA LOGGER in the main menu and confirm with .
2. In the menu DATA LOGGER, confirm the menu item CONTINUOUS LOGGER with .

The following menu opens.



Figure 5.1

3. Press  to confirm the menu item CONFIGURATION.
The window for the logger configuration opens.

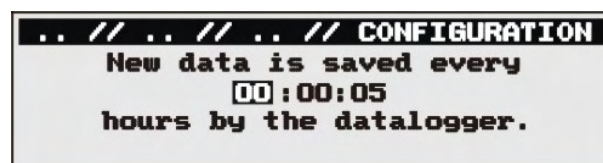


Figure 5.2

4. Use the cursor keys to set the calibration interval.
Use  or  to select a number and  to mark the next digit.
Confirm the selected interval with .

NOTE:

The shortest interval to be selected is 5 seconds.

5.2.1.2 Recording and saving measuring values

Starting the data logger:

1. Mark the menu item START/STOP in the menu
DATA LOGGER//CONTINUOUS and press  to confirm.
The message DATA LOGGER RUNNING will appear.
2. After starting the data logger, the menu automatically returns to the measuring mode.

NOTE:

Recording of data is possible only when the data logger is in the measuring mode. When a menu is opened with  or  no data are recorded.

Stopping the data logger:

1. Mark the menu item START/STOP in the menu
DATA LOGGER//CONTINUOUS and confirm with .
The message DATA LOGGER STOPPED will appear.
2. After stopping the data logger, the menu automatically returns to the measuring mode.

Other possible messages:

- "The data logger is running. Do you want to stop it? (Touchkey / ENTER)"
To stop the data logger press  to confirm.
- "The data logger has already recorded three series of measurement."
A new start of the logger is possible only after deleting the data (please see hint section 5.2).

5.2.2 How to operate the measuring point data logger (optional)

1. Connect the TouchMemory stick with the **Digox 6** (see figure 1.2) and work in the "Measuring" screen.
2. If you want to record the current value, touch the stick on the measuring point Touchkey. The name of the measuring point and the current measuring value is displayed and then saved.
3. If the user of the device changes, the new user touches the stick on his/her User Touchkey. The current user is displayed briefly and then saved.

5.2.3 Output of measuring values

There are two possibilities of reading out the measuring values saved in the **Digox 6**:

- The supplied DigoxWin program can be used to read out the measuring values.
- The measuring values of the measuring point data logger can be displayed.

Reading out the measuring values through DigoxWin

1. Install the DigoxWin program on the PC, see section 5.4.
2. Use the supplied interface cable to connect the **Digox 6** with a free serial PC interface (e.g. COM1).

NOTE:

The transfer rates [9600 Baud] of the **Digox 6** and DigoxWin program must be identical:

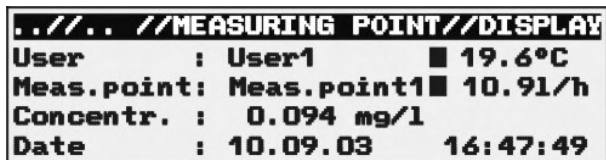
3. Start DigoxWin and open the menu item COMMUNICATION to select the entry READ OUT DATA LOGGER. Now the measuring values will be read out from the data logger of the Digox 6.

NOTE:

For using DigoxWin, please read section 5.4.

Displaying measuring values (only measuring point data logger)

1. Mark the menu item DISPLAY MEASURING VALUES in the menu DATA LOGGER//MEASURING POINT.
2. Press  to confirm.

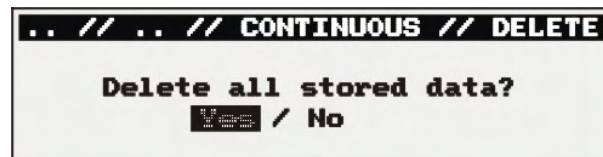


```
..//.. //MEASURING POINT//DISPLAY
User      : User1      ■ 19.6°C
Meas.point: Meas.point1■ 10.91/h
Concentr.  : 0.094 mg/l
Date       : 10.09.03   16:47:49
```

Figure: 5.3

5.2.4 Deleting measure values

1. Mark the menu item DELETE in the menu DATA LOGGER//CONTINUOUS and confirm with .



```
.. // .. // CONTINUOUS // DELETE
Delete all stored data?
Yes / No
```

Figure 5.4

2. Quit the menu by pressing .

NOTE:

After confirming the deletion, the display will remain unchanged for about 30 seconds and then return to the menu.

5.3 How to operate DigoxWin

5.3.1 Introduction

The DigoxWin program allows you to:

- Display, save and evaluate measuring data of the **Digox 6**.
- Make selections, e.g. choosing the medium
- Poll the status of the **Digox 6**, e.g. Ks and Kf factor.

Hardware requirements

- 586 PC processor or higher
- a free serial interface
- CD-ROM drive or network for installation

Software requirements

- MS Windows™ 98/2000/XP
- MS Excel™ 2000 or higher

The transfer of the measured data from the **Digox 6** to a PC takes place via a serial interface using the interface cable included in the scope of supply.

The measured data can be processed with Microsoft Excel™.

5.3.2 Installing DigoxWin

5.3.2.1 Windows operating system

1. Insert the installation CD in the drive.
2. Copy the directory \software.english with all subdirectories onto your hard disk.
3. Change into the copied directory and delete the read-only from the file Digoxwin.ini. For this, proceed as follows:
 - a. Use your right mouse key to click on the file,
 - b. Select "Properties".
 - c. Delete the tick "read-only".
4. Use your right mouse button to click on the file Digoxwin.exe and establish a short-cut on the desktop.

5.3.2.2 Checking the data transmission settings

Setting the PC interface

Please check the interface setting in DigoxWin: open the SETTINGS/INTERFACE menu.



Figure: 5.6

The interfaces available on the PC are highlighted.

NOTE:

If a serial mouse is connected to the COM1 port of your PC, you can connect the interface cable to COM 2.

In this case, the settings must be adapted in DigoxWin.

Setting the 9,600 Baud transfer rate

1. Please check the setting of the transfer rate at the **Digox 6** (also refer to section 8.3.4)
2. To check the transfer rate setting in DigoxWin: please open the SETTINGS/INTERFACE menu.

NOTE:

The transfer rate of the PC interface must be the same as the transfer rate of the **Digox 6**. The adaptation is only carried out at **Digox 6** and in DigoxWin, a change in the system control of the PC is not required.

5.3.3 Starting DigoxWin

Double-click the DigoxWin icon. The program surface opens.

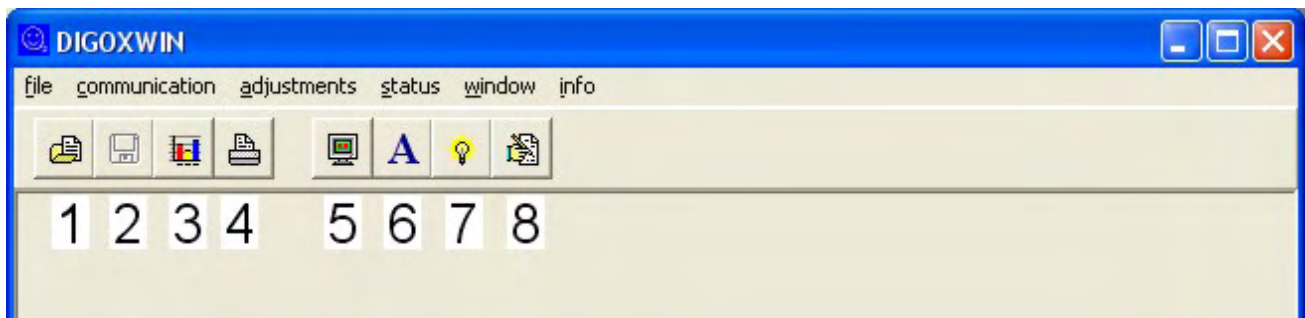


Figure 5.7

- | | |
|---|---|
| 1 | Open data logger file |
| 2 | Save data logger file |
| 3 | Convert data logger file into Microsoft Excel |
| 4 | Print data logger file |
| 5 | Activate online mode |
| 6 | Start Thiedig active calibration |
| 7 | Set limits and Alarms |
| 8 | Poll calibration logs |

Menu overview

Main menu	Entries	Meaning
File	<i>Open</i>	Open data logger files
	<i>Save</i>	Save data logger file
	<i>To Excel</i>	Convert data logger file to Microsoft Excel
	<i>Close</i>	Close data logger file
	<i>Print</i>	Print data logger file
	<i>Exit</i>	Exit DigoxWin
Communication	<i>Online</i>	Start online measuring window
	<i>Read out data logger</i>	Read out the continuous data logger of the Digox 6
	<i>Read out measuring points</i>	Read out the measuring point logger of the Digox 6
	<i>Active calibration</i>	Start active calibration in DigoxWin
Settings	<i>Menu code</i>	Change the menu code for the 2nd menu level in the Digox 6
	<i>Limits & alarms</i>	Change limits and alarm settings in the Digox 6
	<i>Medium</i>	Change medium settings in the Digox 6
	<i>Recorder output</i>	Change recorder output settings in the Digox 6
	<i>Interface</i>	Change the interface in DigoxWin
	<i>Language</i>	Set the menu language in DigoxWin
Status	<i>Ks factor</i>	Read out the Ks factor in the Digox 6
	<i>Kf factor</i>	Read out the Kf factor in the Digox 6
	<i>Calibration log</i>	Read out the calibration log in the Digox 6
	<i>Battery status</i>	This function is not supported by the stationary Digox 6
Window		Menu for the arrangement of the windows opened in DigoxWin
Info		Display the DigoxWin program version

5.3.4 Processing measuring data on the PC

The **Digox 6** offers several ways of processing measuring data on the PC and to save them as a file:

- Online logging
- Reading out the continuous logger and the measuring point logger (optional)
- Reading out the measuring data via MS Excel

Preparation

Connect the PC to the **Digox 6** and start DigoxWin.

- 3 Sampling interval for online measurement
5, 10, 15, 20, 25, 30 seconds
- 4 Current data record number
A maximum of 4,000 is possible,
if there are more than 4,000, DigoxWin will
automatically create a new logger file with
the file number 02.
- 5 Button for starting/stopping the recording
- 6 Close the online mode window.

NOTE:

A new file will be automatically created with every new starting of the online mode.

5.3.4.1 The online data logger

Data currently measured at the **Digox 6** are represented on the PC in the online mode. The online data logger can be used to save the data.

1. Activate the online mode. Click the icon (5) (figure 5.7) or select menu item COMMUNICATION/ ONLINE.
2. The online logger is displayed.

Online logger files are saved automatically by the DigoxWin program.

The files are saved on the PC in the subdirectory named \Logger and can be opened through the icon (1) (figure 5.6) or the menu item FILE\ OPEN. In order to save, you must have enough free memory on your hard disk.

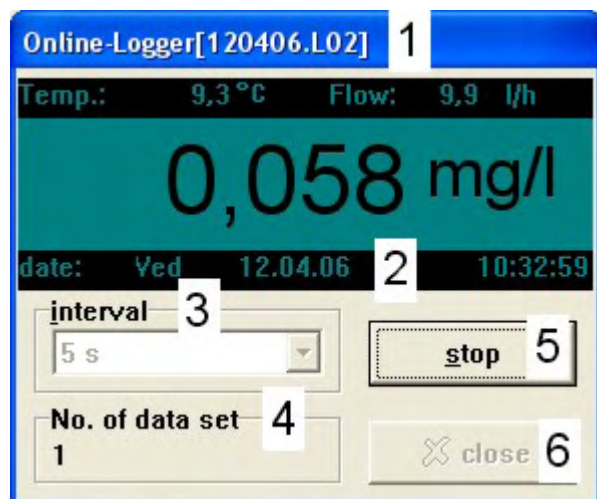


Figure: 5.8



WARNING!

The hardware was not designed for simultaneous operation of the continuous data logger in the **Digox 6** and of the online mode and should therefore be avoided. If this is not observed, the fault message "EEPROM-Error at ..." may appear on the **Digox 6** display (also refer to section 7).

- 1 File name of the logger file
120406 Date (dd.mm.yy)
L identification for online logger
02 current file No.
- 2 Measuring data
according to the display
"Measuring" at the **Digox 6**

5.3.4.2 Reading out the data storage in the Digox 6

1. To read out the measuring data of the logger in the **Digox 6**, open in DigoxWin the menu item COMMUNICATION/ READ OUT DATA LOGGER.
2. The measuring data are transferred to the PC. A corresponding message is faded in the DigoxWin program window.
3. Then the transferred measuring data are displayed in DigoxWin as a table.

NOTE:

In order to read out data, the **Digox 6** must be switched on.

4. To save measuring data select icon (2) (figure 5.6) or the menu item FILE/ SAVE.
5. Enter the file name and click OK.

The data are saved in a file with the following extensions:

- KON – continuous logger
- MES – measuring point logger

5.3.4.3 Evaluate measuring data

The measuring data read out from the **Digox 6** can be evaluated in Microsoft Excel. For this purpose, a function for the conversion of data into Microsoft Excel format has been integrated into DigoxWin.

- Select icon (3) (figure 5.7) or menu item FILE\ TO EXCEL.
- Enter a name for the new file, using the extension "xls" and click the Save button to confirm the file name.
- MS Excel will be opened and the measuring data will be transferred.

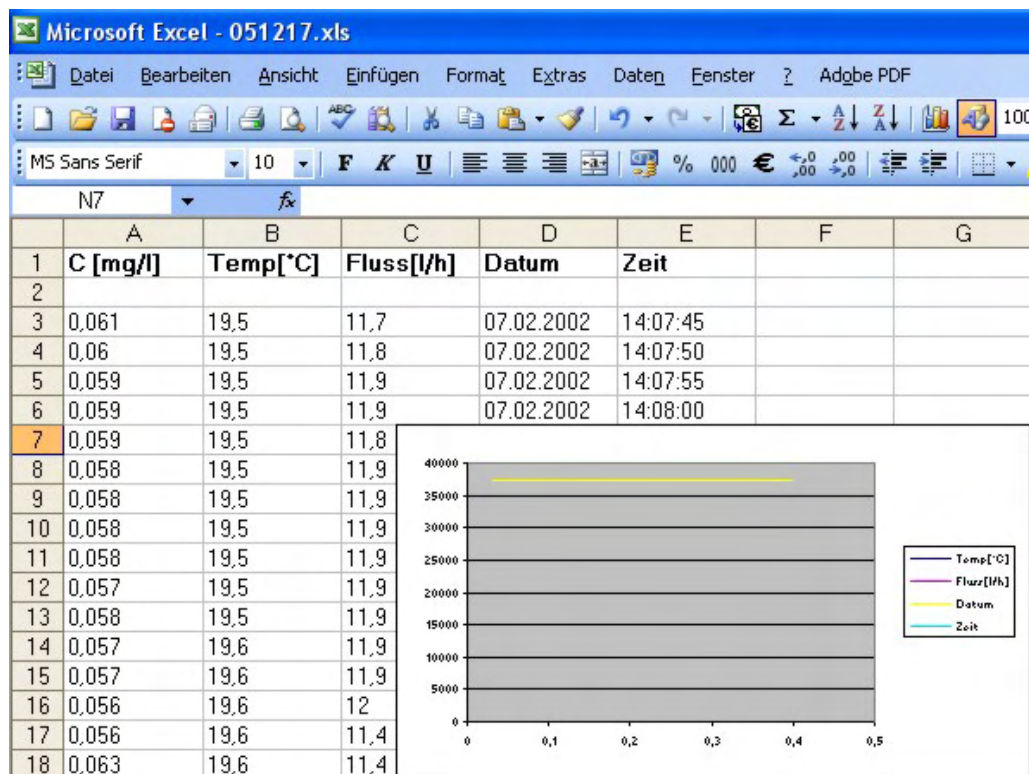


Figure: 5.9

In Excel, the measuring data can be displayed in tables or graphically and be saved and printed.

NOTE:

With some computer configurations, fault messages may appear when converting measuring values from DigoxWin to Excel. Therefore, we recommend importing the DigoxWin file in Excel via the Excel "Import" function. In case of questions or problems, please contact our maintenance hotline.

5.3.5 Further DigoxWin functions

Make settings

The following functions can be read out from the **Digox 6** (click the "Read out" button), be changed in DigoxWin and be saved again in the **Digox 6** (click the "Write" button):

- Code for the 2nd menu level
Select the menu item
SETTINGS\ MENU CODE.

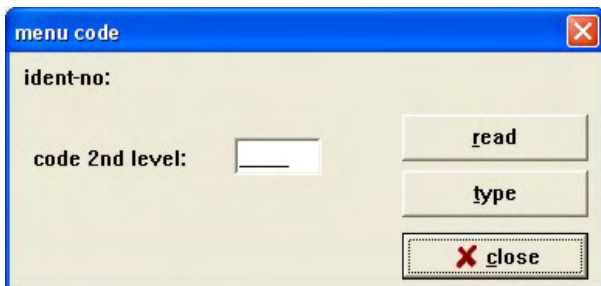


Figure 5.10

- Read out and change recorder outputs
Select the menu item
SETTINGS\ RECORDER OUTPUTS.

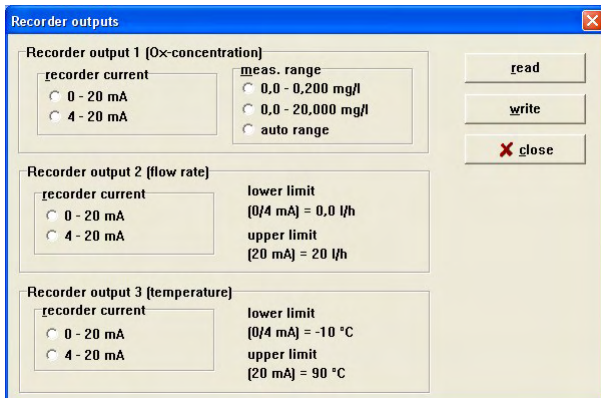


Figure 5.11

NOTE:

Only recorder output 1 is available at the **Digox 6**.

- Select medium
- Select interface and transfer rate,
see section 5.3.2
- Change limits and alarms
not available with the **Digox 6**

Click the "Close" button to exit the current menu.

Poll status messages

The following values or states can be read out from the **Digox 6** and displayed in DigoxWin.

- Calibration factors
Select menu item STATUS\ KS FACTOR: Ks
value of the oxygen calibration
Select menu item STATUS\ KF FACTOR:
Kf value of the flowmeter calibration
- Select calibration log
Menu item
STATUS\ CALIBRATION LOG.

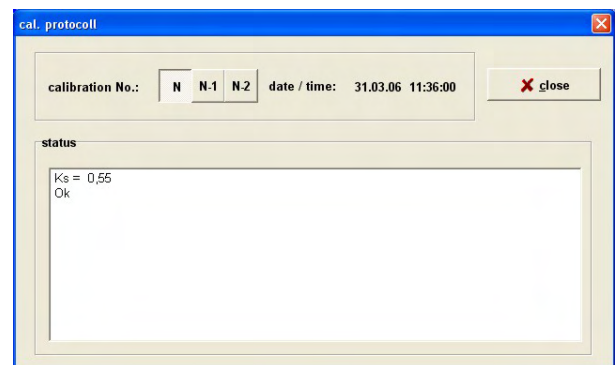


Figure 5.12

Click the N, N-1 or N-2 button to display the calibration log:

N last calibration log
N-1, N-2 logs recorded earlier

6 Maintenance



WARNING!

Only use original parts from Dr. Thiedig when carrying out maintenance work. Only these parts have been checked and fulfil all requirements.

If foreign parts are used, no claims can be made regarding the proper operation of the **Digox 6**.

6.1 Cleaning the electrodes

6.1.1 General hints

NOTE:

Clean the measuring electrode when the Ks factor is smaller than 0.2. You can poll the Ks factor in the menu STATUS.

After cleaning the electrodes, always carry out a Thiedig active calibration. The measuring sensibility of the measuring electrode can change greatly within the first hours after cleaning. We recommend a second calibration after some time.



WARNING!

Do not clean the reference electrode, this will render them useless.

You need the following for cleaning:

- A detergent (chlorine-free, e.g. AJAX powder lemon fresh), cleaning powder (included in the supply)
- A soft tissue, filter paper or the like
- water
- a brush for cleaning the counter-electrodes (included in the supply)
- a tooth brush or the like (recommended for cleaning the contact piece)
- compressed-air pistol (if available)



WARNING!

Do not use any detergents which contain chlorine or powerful rubbing-off substances. This can damage the electrodes.

6.1.2 Steps to be performed

Dismantling of the analyser block:

1. Lie the analyser flat on a table with the reverse side showing upwards.
2. Loosen the knurled screws on the cover of the analyser block and remove the sealing plug.
3. Loosen the knurled nuts and withdraw the plug from the electrodes.
4. Now you can take off the analyser block from the holders. Loosen the connecting plug for the temperature and flow measurement and remove the block.

Cleaning the measuring and calibration electrode:

1. Unscrew the upper pressure pieces and pull out the respective electrodes.
2. Clean both electrodes with a detergent (cleaning powder) and filter paper or a soft tissue.
After this, flush the electrodes carefully with water.

NOTE:

Do not touch the measuring electrode with your fingers after cleaning.

Cleaning counter-electrodes and contact pieces:

1. Unscrew the lower pressure pieces and remove the respective contact pieces (if required, use pliers).
2. Use the brush included in the supply to clean the counter-electrodes with the same detergent. After cleaning, flush the counter-electrodes with water.
3. After cleaning the counter-electrodes, the contact pieces must also be cleaned. For this, use the tooth brush.

Blow all the parts dry and re-install the analyser block in the reverse order.

NOTE:

The inclined surface at the shaft of the measuring and calibration electrode must not block the aperture to the flowmeter or to the mixing spiral. The surface where the electrodes and contact pieces are connected must be dry.

6.2 Exchanging diaphragm and sealing rings

Dr. Thiedig+Co recommends to annually change the diaphragm and all sealing rings at the analyser block.

6.2.1 General hints

To exchange the diaphragm and the sealing rings, the analyser block must be dismantled.

NOTE:

Carry out all works in a clean, dry place.

6.2.2 Means required

To dismantle the analyser block, you need:

- a SW 7 socket spanner
- a cross-tipped screwdriver
- a special screwdriver for the diaphragm (special tool)
- an electrode removing tool (special tool)
- a test tube brush (accessory kit)
- Vaseline
- 15% KCl solution
- a clean cloth as base
- a mild cleaning solution (e.g. using dishwashing agent)
- a set of sealing rings DG 50.35.00
- diaphragm DG 50.09.00

NOTE:

In order to maintain the analyser block, we offer the service set DG 50.91.00.

It contains all required tools and auxiliary substances as well as a service manual.

6.2.3 Works to be carried out

Dismantling the analyser block:
see section 6.1.2

NOTE:

Place the analyser block on a clean cloth. Please observe figure 10.1. when dismantling the unit.

Dismantling the analyser block:

1. Unscrew the temperature sensor (24) by loosening the black knurled nut. Take care not to turn the connection cable. Otherwise, this can damage the contact pin.
2. Unscrew the pressure pieces (23).
3. Withdraw the measuring electrode (13) and the contact pieces (4+14).



WARNING!

When dismantling the measuring electrode (13), keep it straight, carefully removing it from the block without the metal touching the aperture.

4. Unscrew the reference electrode (10). Pour the KCl solution into a beaker glass and discharge it in the drain.



WARNING!

Do not clean the reference electrode (10). The coating must be dark grey. If the colour is light grey, the reference electrode must be replaced. When sliding back the grey conduit, make sure that the inclined surface at the shaft of the electrodes does not block the aperture (air vent).

5. Use the (SW 7 mm) socket spanner to loosen the 4 hex nuts (21). Withdraw the connection rods (19).
The 5 single blocks are now separated from each other.
6. Use the special screwdriver to remove the diaphragm (7).

7. Loosen the screws (29) at the flowmeter block (16) and unscrew the adapters (18) from the flowmeter (27).

8. Withdraw the counter-electrode (9).

NOTE:

Always use the special electrode removing tool (DG 94.05.90) to remove the counter-electrode. Other tools may damage the analyser block.

9. Remove all old sealing rings from the block parts.
10. Clean the block parts in the cleaning solution. Finally, flush the parts with clear water.

NOTE:

In order to remove coarse coatings on the counter-electrodes, the cleaning brush can be combined with a mild abrasive. Afterwards, the counter-electrodes must be rinsed thoroughly.

11. Carefully dry the block parts.
12. Now insert the new diaphragm and the new sealing rings.

NOTE:

We recommend replacing the diaphragm and the sealing rings together, as damaged sealing rings may corrupt the measuring result. When exchanging the sealing rings, please observe figure:10.1. and figure:10.2.

13. When reassembling the unit, proceed in the reverse order. Then refill the analyser block with KCl solution, also refer to section 3.3.



WARNING!

Very carefully tighten the tension rod. If it is tightened too firmly, this may tear the block parts.

No claims can be made from the resulting damages.

NOTE:

Applying a thin fatty film on the surface of the sealing rings makes it easier to insert the counter-electrodes into the block.

In addition because of this, damages of the sealing rings will be avoided when inserting at the block's transverse bores.

Damaged sealing rings are often the cause for a liquid inlet occurring later between the counter-electrode and the block and the resulting corrosion of the counter-electrode.

6.3 Hints regarding the moisture indicator

The housing of the Digox 6 is equipped with a moisture indicator for the housing interior (please refer to figure 1.2).

Possible residual moisture is taken up by the moisture indicator. The viewing window displays the residual moisture in the housing.

- blue colouring: humidity < 40%, state is completely harmless
- white colouring: humidity > 40%, exchange moisture indicator

NOTE:

We recommend regularly checking the viewing window and annually replacing the indicator.

6.4 Hints regarding the handling of rechargeable battery

An important element for measuring with the **Digox 6** is the state of the battery. The **Digox 6** is equipped with an improved nickel-metal-hydrid battery.

NOTE:

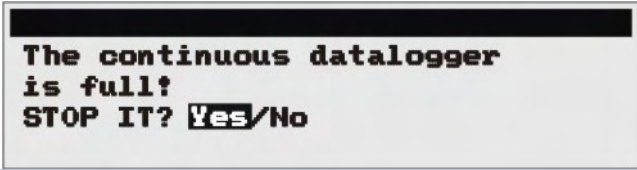
The battery is a part liable to wear. This already occurs when leaving the manufacturer. As a device manufacturer, we guarantee that batteries supplied by us have only been stored at our premises for a short time and that they are then directly delivered to our customers.

Hints regarding the handling of the battery

In order to optimize the service life of the battery and thereby the measurement stand-by of the **Digox 6**, we recommend considering the following hints:

- Avoid extreme ambient temperatures – do not store the device in a cold storage room or in full sun.
- Only reload the battery if its capacity is under 50%.
- Take care of the battery – unload and load the battery at least once a month overnight:
 - o Fully unload the battery until the device switches itself off
 - o Afterwards load the battery with the charging unit
 - o Observe the indicator regarding the loading state
Indicator reading after unloading at 0% and during loading increasing to 100%
 - o Normal loading time is 3-4 hours
- Do not always connect the device to the charging unit when it is not being used. By doing this, the available capacity of the battery will be reduced.

7 Fault messages and troubleshooting

Cause	Remedy
 The flow is flashing in the right top of the display and warning triangle appears. Flow < 3.0 l/h or > than 20 l/h Incorrect Kf factor, $0.9 > K_f > 1.2$ The throughput displayed is lower than expected: the flowmeter is dirty or faulty	Set the flow at the regulating valve to about 10 l/h. Check the value in the right top of the display. Re-calibrate the flowmeter Clean the flowmeter - Rinse the analyser block - Open and clean the flowmeter - If this does not work, please contact our maintenance hotline
 The temperature is flashing in the left top of the display, for example, the display reads 49.9°C The feed line to the temperature sensor has been interrupted The temperature sensor is faulty	Check the proper seat of the sensor connector. Replace the temperature sensor.
Display message: 	Yes will stop the recording by the data logger. If No is selected, the logger continues running, and the whole memory is overwritten. The previously saved measuring values get lost. After pressing a key, the "Measuring" screen will be displayed.

Cause	Remedy
<pre>User:***** Meas.***** The continuous datalogger is still active! STOP IT? Yes/No</pre> After switching on the unit, the following message is displayed	The unit was switched off with a running continuous logger. Decide with the cursor keys whether the data logger should continue.
No connection can be established between the Digox 6 and DigoxWin.	Check the following points: - Interface cable OK - Correct interface at the PC and in DigoxWin - Same baud rate Digox 6 and DigoxWin - Correct DigoxWin version with regard to the Digox 6 firmware NOTE: Always use the supplied software version with the respective analyser.
Display message: "EEPROM-Error at" Simultaneous operation of the continuous logger in the Digox 6 and of the online mode in DigoxWin. EEPROM-Error at the processor board	Press  or switch the unit off and on again (if this is not successful, please call our maintenance hotline). The hardware was not designed for simultaneous operation of the continuous data logger in the Digox 6 and of the online mode or of the diagram in Dkonfig, respectively. Please contact our maintenance hotline.

Cause	Remedy
Calibration error A: At the start of the active calibration (sec.0), the flow was between 5 l/h and 15 l/h, but was not between the ideal value 9 l/h and 11 l/h). Calibration error B: The O₂ concentration, which was determined in sec.0 to sec.5, was bigger than 1.000 mg/l. MENU // STATUS Last three active calibrations 28.10.03 13:06 Ks=0,98 OK 28.10.03 12:41 Ks=0,95 A 28.10.03 11:31 Ks=0,96 B	Calibration error A: Set the correct flow of 10.0 l/h (tolerance: ± 0.5 l/h is permissible). Calibration error B: Reduce the oxygen concentration which is in the sample to a value below 0.500 mg/l and start the calibration again.
Calibration error C: ZERO VALUE INSTABLE. The current measured between sec.15 and sec.20 deviates more than 5% with regard to the current measured between sec.0 and sec.5. Calibration error D: The temperature measured in sec.20 deviates more than 5% with regard to the temperature measured in sec.0. Calibration error E: The flow measured in sec.20 deviates more than 5% with regard to the flow measured in sec.0. MENU // STATUS Last three active calibrations 28.10.03 13:06 Ks=0,98 C 28.10.03 12:41 Ks=0,95 D 28.10.03 11:31 Ks=0,96 E	Calibration error C: Wait until the displayed measuring value is constant and start the calibration again. Calibration error D: Wait until the sample temperature is stabilized and then start the calibration. Calibration error E: Wait until the displayed flow is constant and then repeat the calibration.

NOTE:

In case of any questions or problems, please call our maintenance hotline.
Please also consider the information provided on our homepage. There you find FAQs and answers. (coming soon).

Notes:

8 Special functions

The special functions of the **Digox 6** allow to poll device states or to make settings.

8.1 Status display



Figure 8.1

Use  and the menu item STATUS for the status display. Here, the following information is provided:

- Ks factor
refer to section 4.4
- Kf factor
refer to section 4.3
- zero current
refer to section 4.7
- Medium
here, the medium setting is displayed,
the default setting for the **Digox 6** is *Pilsner*
- measuring range
here the setting of the recorder output is displayed.

NOTE:

The display of the measuring range does not refer to the measuring range used by the **Digox 6**. Here the current setting for the measuring range of the recorder output is displayed.

8.2 Selecting recorder measuring ranges and output currents

1. In the main menu, press  until the menu item MEASURING RANGES is highlighted. Press  to open the menu MEASURING RANGES.

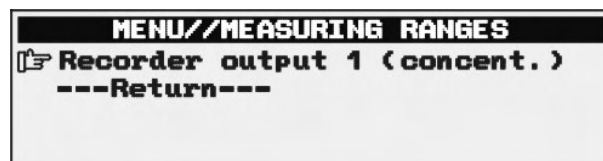


Figure 8.2

2. Select the recorder output and confirm with . The current measuring range is highlighted in the menu opened. Use  and  to set the desired measuring range and  to confirm. To save the setting, highlight the menu RETURN and press .

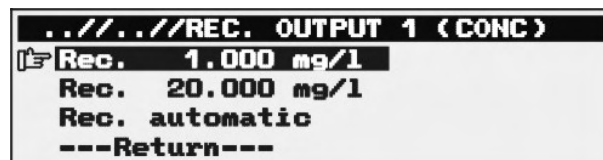


Figure 8.3

The following measuring ranges can be selected for the recorder outputs:

- concentration 1,000mg/l, 20,000mg/l, automatic identification of the measuring range

NOTE:

The concentration ranges are set in the works, if required by the customer, they can be adapted by Dr. Thiedig+Co service personnel.

3. After saving, use  and  in the subsequent menu to set the output current and save the value with .

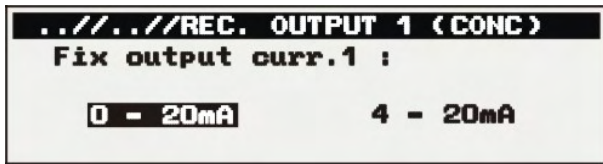


Figure 8.4

4. After saving, the menu MEASURING RANGES will open. Use  to return to the "Measuring" screen.

8.3 Menu level 2 functions

NOTE:

The functions of menu level 2 and their settings can be protected from unauthorised users with a four-digit code. The default setting is 9999. It can be modified using the menu item GENERATE THE CODE. Take care to remember the code. It can also be changed in DigoxWin, please refer to section 5.3.5.

1. Select the menu item CODE in the main menu and confirm with .
2. Enter the code, using  and  to change the number and  and  to change digits. Press  to confirm your entry.



Figure 8.5

3. The main menu of menu level 2 opens.



Figure 8.6

8.3.1 Make system settings

In the main menu of menu level 2, highlight the menu item SYSTEM ADJUSTMENTS and confirm with . The SYSTEM menu opens.

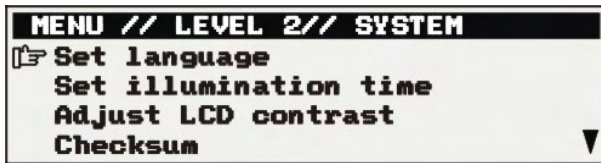


Figure: 8.7

Set language

Highlight the menu item and press . To change the language, highlight the language desired and confirm with . To save, highlight the menu field RETURN using  and press .

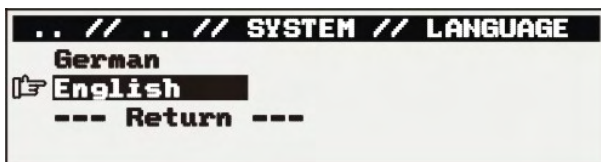


Figure: 8.8

Set illumination time

Highlight the menu item and press . Use  and  to set the illumination time and confirm with .

Set LCD contrast

Highlight the menu item and press . Use  and  to adjust the contrast (in steps between 0 and 100%). Press  to confirm your selection.

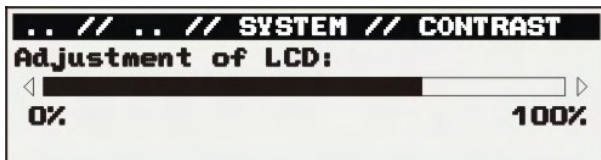


Figure: 8.9

Checksum

The checksum serves to check the device components before switching off. Highlight the menu item and press . Use  and  to change between YES and NO and  to confirm.

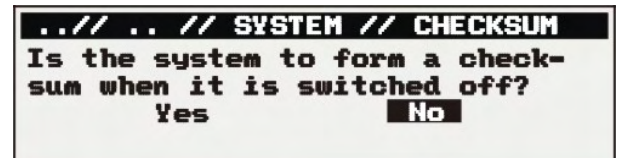


Figure: 8.10

8.3.2 Setting the interface

This function serves to select the interface and the related transfer rate (baud rate).

1. In the main menu of menu level 2, highlight the menu item INTERFACES and press . The INTERFACES menu opens.

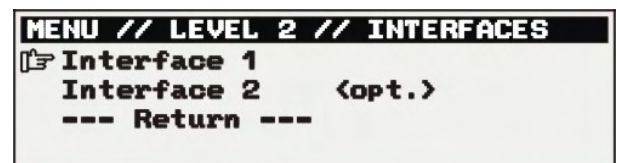


Figure: 8.18

2. Select interface 1. Press . The INTERFACES menu opens..

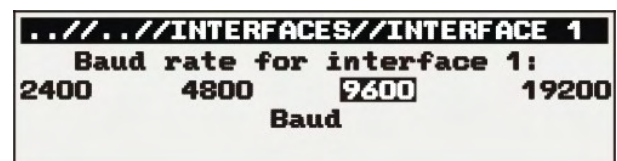


Figure: 8.19

3. Select the transfer rate: Press  or  and confirm with . To return to the main menu, select the RETURN entry and confirm with , or use  to return to the "Measuring" screen.

NOTE:

The function INTERFACE 2 is an option and not supported by the **Digox 6**.

The transfer rates of the PC interface must be the same as the transfer rate of the **Digox 6**.

The transfer rate of the PC is set using the DigoxWin program (refer to section 5.3.2.2).

8.3.3 Setting the clock

In the menu of menu level 2, press  and highlight the menu item SET CLOCK. Press .

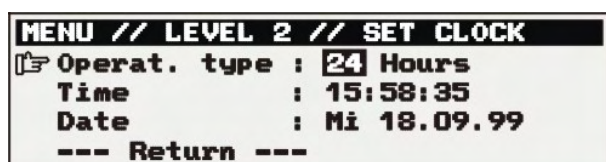


Figure: 8.20

Mode of operation

Press  to activate the setting mode, 24 is highlighted. Press  to set the 12 h display and  to confirm your selection.

Change time and date

Highlight the menu item and confirm with . The setting mode is active. Changes are made using the cursor keys. Use  to confirm.

After setting, highlight the menu item RETURN and confirm with .

8.3.4 Polling the identification number

In the menu of menu level 2, use  to highlight the menu item IDENTIFICATION and press .

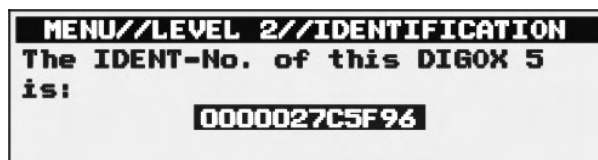


Figure: 8.21

The 12-digit IDENT number of your unit is displayed. Use  to return to the menu of menu level 2.

8.3.5 Enabling options

In the menu of menu level 2, use  to highlight the menu item ACTIVE OPTIONS and press .

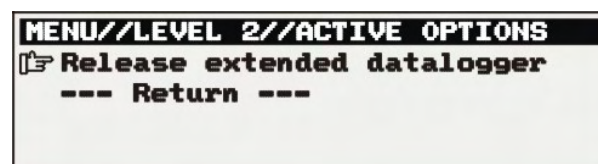


Figure: 8.22

This menu item allows you to use a code to extend the memory of the data logger from 1,000 to 3,000 values.

NOTE

Enabling the extended data logger is done by our maintenance service.

8.3.6 System check

This menu provides test programs for the keyboard function and the display.

In the menu of menu level 2, press  and highlight the menu item SYSTEM CHECK. Press

.

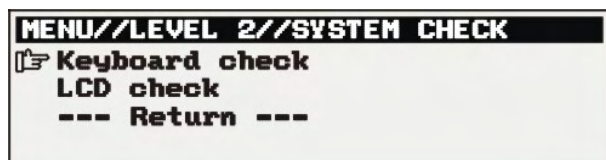


Figure: 8.23

Keyboard check

Select the entry in the menu and press . You are prompted to press specific keys within 3 seconds.

LCD check

Highlight the menu item and press . A check program is run automatically.

After the completion of the system check, highlight the menu item RETURN and confirm with .

8.3.7 Generating a code

You can use this menu item to generate a new access code for menu level 2.

NOTE

If you have changed the access code and forgotten it, it can be read out and changed again in DigoxWin.

1. Highlight the menu item GENERATE CODE and press .

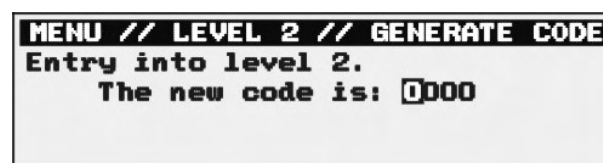


Figure: 8.24

2. Set the new code: Use  or  to change the numbers and  or  to select the next/previous digit. Press  to save.

IMPORTANT NOTE!

Take care to remember the new code for the later activation of menu level 2.

3. Highlight the menu item RETURN and confirm with . The main menu opens, the menu item code is highlighted.

8.3.8 Flowmeter

Under this entry, the calibration of the flowmeter is supported, as described in section 4.3.

9 Technical data Digox 6

Type:	Digox 6 EC
Measuring range:	0.001 ... 20.00 mg/l O ₂
Measuring method:	Potentiostatic 3-electrode measuring system
Measuring electrode:	Silver
Counter-electrode:	Stainless steel (material no. 1.4571)
Reference electrode:	Silver/Silver-chloride electrode in 15% potassium chloride (KCl-) solution
Sample conductivity:	> 20 µS/cm (always fulfilled in beverages)
Display:	Graphic display
Accuracy:	±1% based on the measuring range end value in the lower range 0...1.000mg/l Temporary deviations of 10% of the measuring value can be caused by high frequency irradiation.
Data logger:	continuous data logger, adjustable interval for 1,000 measuring values (3,000 measuring values as an option Measuring point data logger for 200 measuring values (TouchMemory system)
Data interface:	RS 232
Recorder output:	One output 0(4) ... 20mA for concentration: 0...1.000 mg/l 0... 20.00 mg/l to be set to a fixed value or automatic changeover and detection of the measuring range

IMPORTANT NOTE!

Connection of a recorder with a grounding potential at the measuring reference point (GND) constitutes an illegal operating status, where signal corruption is possible due to potential and hum loops.
The recorder cable must not be longer than 3 metres.

Time constant t_{90}:	<10sec
Ambient temperature:	-5...40°C
Sample temperature:	0...60°C (up to 50°C compensated) as an option suitable for CIP up to 110°C (brown analyser block) with nitric acid and chlorine-free cleaning and disinfection agents
Sample pressure:	8 bar maximum
Sample flow:	3-18 l/h (compensated)
Calibration:	Fully automatic Thiedig active calibration, reference calibration
Power supply:	12 V NiMH battery for approximately 8 hour operation 100-240V AC, 50/60 Hz 13VA (plug-in charging unit)
Protection class:	IP65
Weight:	3.8 kg
Dimensions:	270 x 330 x 140 mm

10 Appendix

10.1 Definition of terms

Measuring range	The measuring range includes the concentration range in which the unit can safely detect dissolved oxygen.
Time constant t_{90}	This is the time the unit needs to respond with a 90% rise of the level to a sudden concentration change.
Ambient temperature	This is the temperature permitted in the environment where the unit is operated.
Sample temperature	This is the temperature of the sample where safe dissolved oxygen can be guaranteed.
Drift	The drift is the systematic change (decrease or increase) of the sensitivity of the measuring electrode.
Compensation	Within this range, the measuring value is compensated for the parameter.

10.2 Scope of supply with accessories kit

No.	Designation	Item No.
1	Digox 6 EC analyser (portable)	DG 65.00.00
1	Digox 6 EC accessories kit (portable)	DG 65.30.00
1	Bottle with 100ml KCl solution	DG 09.41.00
1	Replacement diaphragm	DG 50.09.00
1	Sealing ring set Digox 5/6	DG 50.35.00
1	Test tube brush	ZZ 19.00.40
1	Measuring cylinder 250ml	ZZ 13.00.62
1	DigoxWin software	TN 68.50.00
1	Interface cable	DG 50.80.09
1	2m hose 5x1.5 mm	WW 60.00.90
2	Hose fitting	ZZ 55.16.03
1	Charging unit	DG 50.31.00
1	Reducing spout	ZZ 06.00.16
1	Cleaning powder for electrodes	
1	Digox 6 operating manual	
1	Test certificate	

10.3 Spare parts

10.3.1 Analyser block Digox 6

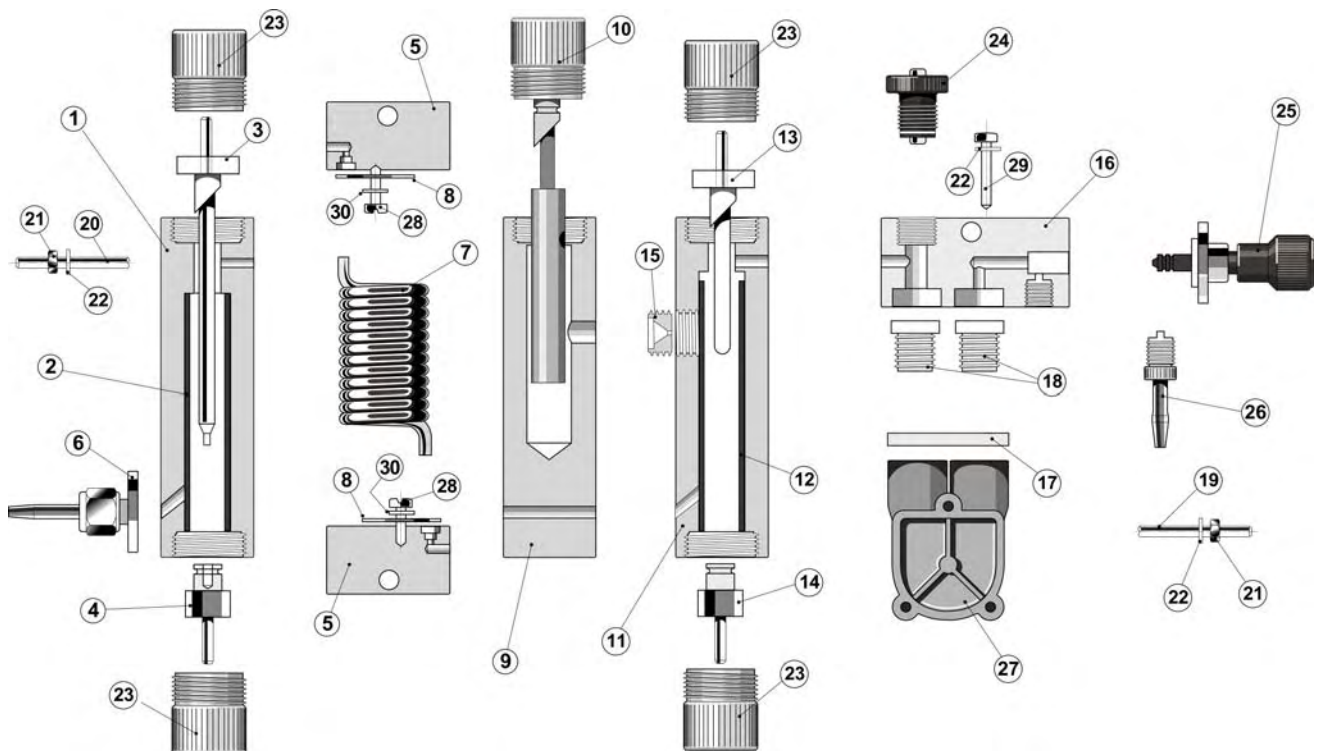


Figure: 10.1 Block parts **Digox 6**

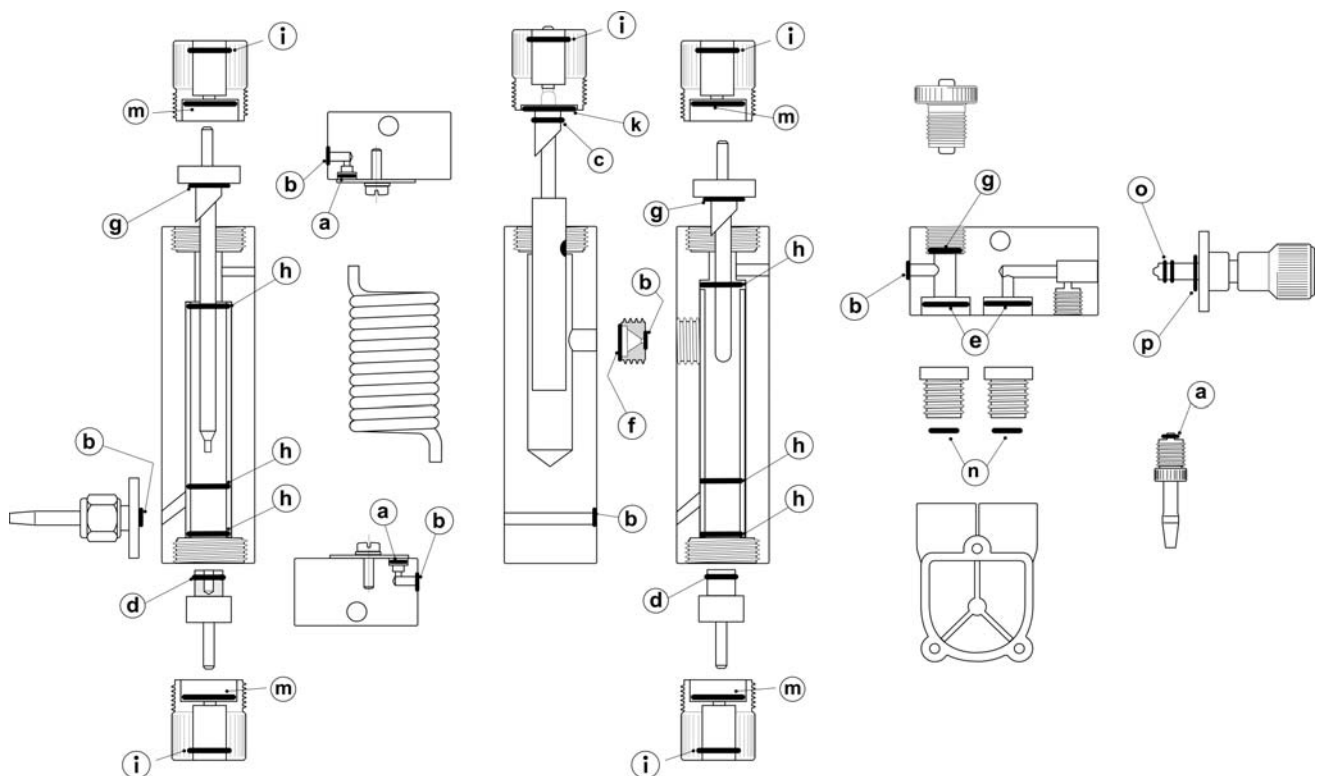


Figure: 10.2 Sealing rings **Digox 6**

Block parts Digox 6 Figure 10.2

Item	Item No.	No.	Name
1	DG 94.05.01	1	Calibration block
2	DG 94.05.02	1	Counter-electrode F
3	DG 94.06.00	1	Calibration electrode K
4	DG 94.11.00	1	Contact piece with borehole
5	DG 94.05.04	2	Tube coil block
6	DG 94.23.11	1	Nozzle
7	DG 94.05.05	1	Tube coil
8	DG 94.05.06	2	Plate
9	DG 50.05.07	1	Reference block
10	DG 94.07.00	1	Reference electrode V
11	DG 50.25.08	1	Measuring block
12	DG 94.05.09	1	Counter-electrode G
13	DG 94.08.00	1	Measuring electrode
14	DG 94.10.00	1	Contact piece
15	DG 50.09.00	1	Diaphragm DG 5
16	DG 50.25.02	1	Flowmeter block
17	DG 94.25.03	1	Attachment tongue
18	DG 94.25.04	2	Adapter
19	DG 50.05.17	2	Clamping bolt, bottom
20	DG 50.05.18	2	Clamping bolt, top
21	XX 09.34.05	4	Hex nut
22	XX 01.25.06	4	Ring washer
23	DG 94.05.18	4	Pressure piece
24	DG 50.19.00	1	Temperature sensor
25	DG 50.25.40	1	Spindle with flange
26	DG 50.25.30	1	Output
27	DG 50.26.00	1	Flowmeter
28	XX 00.85.06	2	Pan head screws
29	XX 79.85.13	2	Oval head screw

Digox 6 sealing rings (O-rings) Figure 10.2

Pos.	Item No.	No.	Name.	Dimensions
a	ZZ 20.00.33	3	O-ring, Viton	OR 3,68-1,78
b	ZZ 20.00.43	6	O-ring, Viton	OR 4,3-2,4
c	ZZ 20.00.62	1	O-ring, Viton	OR 6,07-1,78
d	ZZ 20.00.63	2	O-ring, Viton	OR 6,75-1,78
e	ZZ 20.00.70	2	O-ring, Viton	OR 7,52-3,53
f	ZZ 20.00.81	1	O-ring, Viton	OR 8-2
g	ZZ 20.01.01	2	O-ring, Viton	OR 10-2
h	ZZ 20.01.21	6	O-ring, Viton	OR 12-2
i	ZZ 20.01.25	5	O-ring, Viton	OR 12,42-1,78
k	ZZ 20.01.52	1	O-ring, Viton	OR 15,6-1,78
m	TN 21.01.99	4	Sheet gasket	
n	ZZ 20.00.71	2	O-ring, Viton	OR 7,65-1,78
o	ZZ 20.00.64	2	O-ring, Viton	OR 6-1
p	XX 04.71.02	1	Safety ring	

10.3.2 Further spare parts

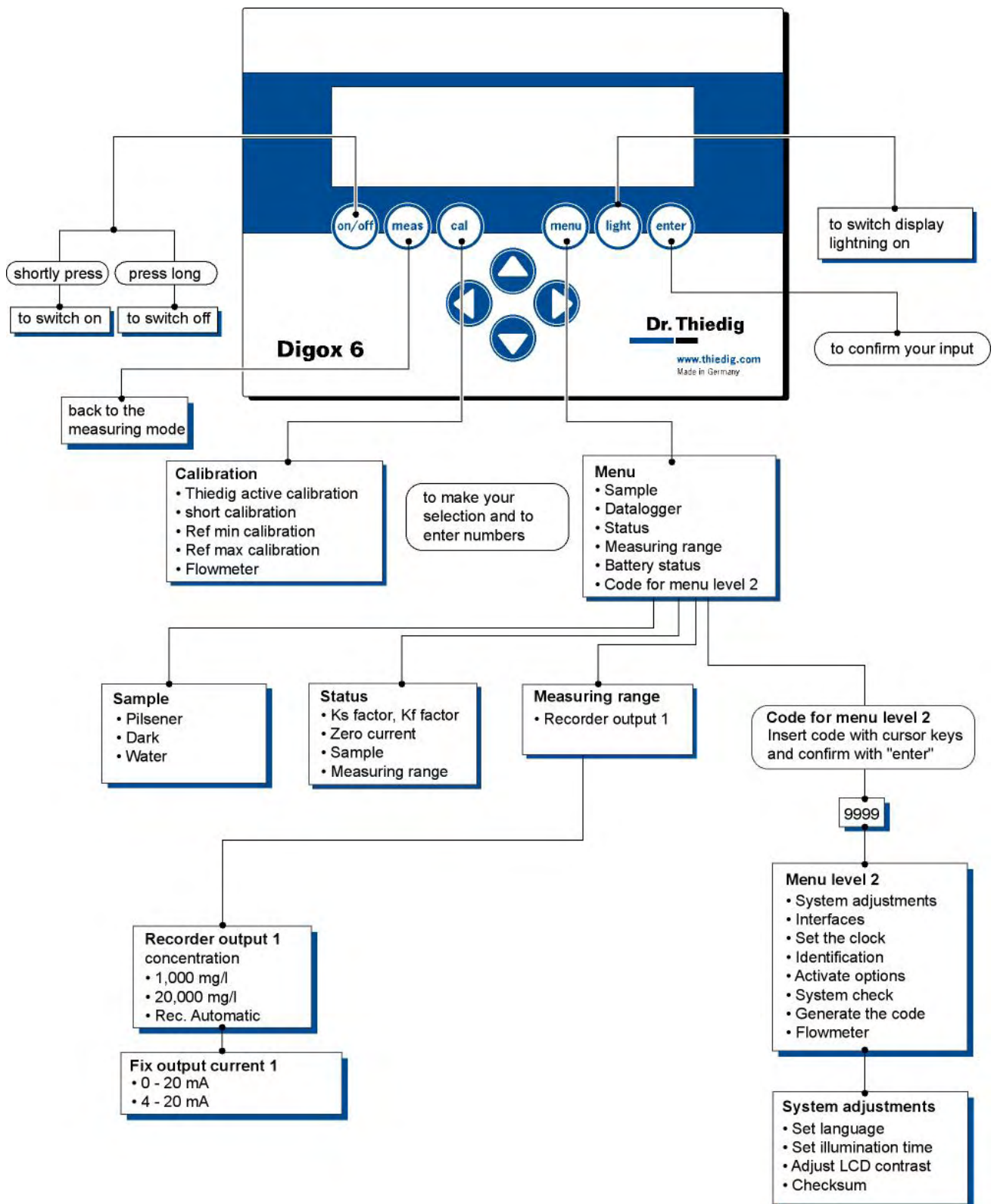
Designation	Item No.
Rechargeable battery	DG 65.17.00
Moisture indicator	DG 02.00.02
Cable harness	DG 50.15.00

**If you require further spare parts, please contact our
service hotline: +49 30 49 77 69 - 42**

10.4 Digox 6 EC unit extension and accessories

Designation	Item No.
Service kit Digox 5/6 EC/K contains all necessary tools and supplies for maintaining the analyser block	DG 50.91.00
Electrode removing tool also included in the service kit Digox 5/6 EC/K	DG 94.05.90
25 x 8 screwdriver also included in the service kit Digox 5/6 EC/ K	05.13.78
Euro adapter for charging unit	ZZ 58.00.94
UK adapter for charging unit	ZZ 58.00.95
US adapter for charging unit	ZZ 58.00.96
Australian adapter for charging unit	ZZ 58.00.97
Cable for recorder output connection	DG 50.80.10
User TouchKey (programmed according to customer)	DG 50.80.12
System accessories	
Touch Memory Set Touch Memory Stick and Measuring point Touch Key (programmed according to customer)	DG 50.80.14
Automatic sampling device to take the sample from bottles and cans	DG 04.62.00
Bottle-turning device to adjust the phase equilibrium in bottles and cans	DG 94.48.00
Total oxygen determination system to calculate the total oxygen in bottles and cans	DG 94.47.10

10.5 Menu overview



10.6 Terminal assignment

Table 10.1: Terminal assignment

	Circular connector/ socket	Sub-D-Socket	Function
Socket 1			
RS 232 / Touch Memory	Pin 1	Pin 3	RDO
	Pin 2	Pin 2	TDO
	Pin 3	Pin 5	GND
	Pin 4		Touch Memory System
	Pin 5		
Socket 2			
Analog Out / Measuring range	Pin 1		Measuring range identification
	Pin 2		
	Pin 3		GND
	Pin 4		0(4)...20mA
Socket 3			
Charger	Pin 1		18VDC
	Pin 2		GND
	Pin 3		n.c.
	Pin 4		n.c.

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Dr. Thiedig + Co
Prinzenallee 78-79
D-13357 Berlin
Phone: +49 30 49 77 69-0
Fax: +49 30 49 77 69-25
Email: info@thiedig.com
www.thiedig.com

Service-Hotline: (+49) 30 49 77 69-42